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ABSTRACT

Using data collected by the National Assessment of Educational Progress (NAEP) through its literacy assessment of young adults, this study addressed the question of whether adult patterns of reading activity related to demonstrated proficiencies. Five reading patterns were developed that represent various combinations of high and low activity with newspapers, magazines, books, and brief documents. Interviews were conducted with 3,618 representative young adults from the NAEP sample. These patterns were found to be related to performance on the three NAEP literacy scales--prose, document, and quantitative--for the total population and for major subgroups as well. Through regression analyses, these patterns were shown to have importance in explaining the literacy performance levels of America's 21- to 25-year olds. These findings are discussed in the context of recent cognitive research that emphasizes the importance of graded contextual practice in the transition from novice to expert status. (Contains 5 tables and 40 references.) (Author/SLD)

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RESEARCH REPORT

THE INFLUENCE OF READING PATTERNS ON THE PROFICIENCIES OF YOUNG ADULTS

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Peter B. Mosenthal
Donald A. Rock

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Educational Testing Service
Princeton, New Jersey
November 1988

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June 1988

Running head: Influence of Reading Patterns

Data analyzed in this study were collected through the National Assessment of Educational Progress (NAEP) as part of its literacy assessment of young adults. The work reported in this paper was supported by the Educational Testing Service (ETS). The views and opinions expressed in this paper are those of the authors and do not necessarily reflect those of NAEP or ETS. The authors wish to gratefully acknowledge Ann Jungeblut and Gita Wilder for their thoughtful comments as well as Joanne Antonoff, Anne Campbell and Eleanor DeYoung for their editorial assistance.

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Abstract

Using data collected by the National Assessment of Educational Progress (NAEP) through its literacy assessment of young adults, this study addressed the question, Do adult patterns of reading activity relate to demonstrated proficiencies? Five reading patterns were developed that represent various combinations of high and low activity with newspapers, magazines, books, and brief documents. These patterns were found to be related to performance on the three NAEP literacy scales — prose, document, and quantitative — for the total population and for major subgroups as well. Through regression analyses, these patterns were shown to have importance in explaining the literacy performance levels of America's 21- to 25- year olds. These findings are discussed in the context of recent cognitive research that emphasizes the importance of graded contextual practice in the transition from novice to expert status.

The Influence of Reading Patterns on the Proficiencies of Young Adults

Introduction

Some thirty years ago, Gray and Rogers (1956) noted that "maturity in reading as one aspect of total development is distinguished by the attainment of those interests, attitudes, and skills which enable young people (and adults) to participate eagerly, independently, and effectively in all the reading activities essential to a full, rich and productive life" (p.56).

According to Gray and Rogers, the mature reader is not merely someone who demonstrates a particular level of achievement or competence. Rather it is someone who has also come to value reading and, therefore, engages in a broad range of reading activities. Gray and Rogers further presumed that through these activities, readers are not only able to satisfy their interests and needs but also continue to expand knowledge and skill in reading.

This observation of some thirty years ago raised the still unanswered question, What is the relationship between adult reading practices and proficiencies? While the question remains unanswered, several research literatures bear on the question. First, there is the time-on-task literature which demonstrates that amount of academic engaged time is related to reading proficiency as measured by standardized reading test scores (Gambrell, Wilson, & Gantt, 1981; Harris & Serwer, 1966). Berliner (1981) reported that time engaged in all forms of reading within a language arts program correlated significantly with reading test scores. Moreover, Allington (1983) extended the argument by describing

research showing that, while instructional time allocated among good and poor reading groups appears to be equivalent, the instructional environment — including the emphasis of the lesson, the number of words read, and the mode of reading — are related to learner behaviors and outcomes.

While the time-on-task literature is an important area of research, its limitation in light of Gray and Rogers' framework of the mature reader is that the research has been restricted to the range of reading acitivities and proficiencies associated with school-based tasks among students who are learning to read. Thus, the question left unanswered here is whether the relationship demonstrated by the time-on-task research extends to adult populations in which reading activities and tasks typically go beyond those commonly associated with school contexts (Heath, 1980; Mikulecky, 1982; Venezky, 1982).

A second area of research, one focusing on adults, has restricted examination to a single aspect — namely, activity. Specifically, studies have been conducted in which the primary purpose was to estimate the reported frequency and time adults with different background characteristics spend with various types of literacy materials (Guthrie, Seifert & Kirsch, 1986; McEvoy & Vincent, 1980; Robinson, 1980; Sharon, 1982). In some cases the research has focused on describing the range of materials adults read in a particular context (e.g. Jacob, 1982;). Other studies have been concerned with the variety of uses and functions of reading (Heath, 1980; Kirsch & Guthrie, 1984a; Miller, 1982).

One important finding that has emerged from these investigations is that adults do, in fact, engage in a broad range of literacy behaviors that frequently involve uses and materials not generally associated with a school context. At the same time, this body of research fails to provide much insight into our understanding of the ways in which patterns of reading activities associated with these diverse materials and uses might influence proficiencies on literacy tasks.

A third set of research studies provides the most direct evidence to suggest a relationship between practice and literacy proficiency among adult populations. Buswell (1937), in studying how a sample of adults in Chicago read, compared the types of materials read by the 100 highest scoring adults with those of the 100 lowest scoring adults. He reported that, whereas, regular newspaper reading for both of these groups was high, there was a large difference in the reported reading of magazines and books. Seventy-four percent of the highest scoring group reported reading magazines regularly as compared with 22 percent of the lowest scoring group. Similarly, 70 percent of the people in the highest reading group reported reading books regularly compared with only 12 percent of the adults in the lowest group.

Within a cross-cultural framework, Scribner and Cole (1981) demonstrated that different cultures or groups may value different kinds of literacy practices. More importantly, the results of this study indicated that the practice of literacy — reading and writing for specific purposes with a restricted set of materials — had facilitative effects on some cognitive processes but not on all measured outcomes. A major conclusion was that the cognitive outcomes associated with literacy were restricted to the particular practices engaged in.

Studies conducted within job related settings have shown that people who engage in a particular type of reading are able to develop their skills in performing closely associated tasks that are not generalizable across a wider range of contexts and materials (Kirsch & Guthrie, 1984b; Scribner, 1984; Sticht, 1982). For example, Sticht (1982) found that marginally literate adults enrolled in a job-related reading program made about twice the gain in performance on job-related tasks than with tasks typically found on standardized reading tests. Among employees of a telephone company, Kirsch and Guthrie (1984b) distinguished among two types of literacy tasks — prose comprehension and text search.

They reported that performance on measures of these two constructs correlated at a relatively low level, sharing only about 10 percent of the variance. In contrast, time spent engaged in text search activities accounted for 32 percent of the variance in performance on text search tasks compared with only one percent on prose comprehension tasks. Paralleling this finding, time reported in prose comprehension activities accounted for 45 percent of the variance with prose comprehension tasks and only two percent of the variance with text search tasks.

Several things emerge from these three research literatures. In beginning reading, children learn the skills that are emphasized in the curriculum (Mosenthal, 1983). For example, if the focus of their instruction is on decoding rather than comprehension, they will perform best on measures of decoding (Barr, 1974-75). This outcome has also been observed with a sample of adults who are learning to read (Frederickson, 1987). Moreover, if the focus of instruction deals primarily with narrative texts rather than other types of prose structures, readers will become most proficient with this genre (de Beaugrande, 1984; Mosenthal, 1985). However, the literature focusing on adults suggests that the typical adult reading demands extend beyond those traditionally associated with school contexts. More importantly, this broader array of reading demands may require different skills and strategies. As a consequence, literacy skills should continue to develop beyond formal schooling. This growth should be fostered, as Gray and Rogers (1956) noted, by engagement in broad and regular reading activities or practices. We would predict, therefore, that adults who engage in the broadest set of reading practices should demonstrate the highest levels of literacy proficiencies. In addition, this relationship should hold for adults regardless of their racial/ethnic background and regardless of their educational attainment.

In the context of the research just described, the purpose of the present study was to address the question, Do adult reading patterns relate to demonstrated literacy proficiencies? To examine this relationship, data collected by the National Assessment of Educational Progress (NAEP) through its literacy assessment of young adults (Kirsch & Jungeblut, 1986) were analyzed. In conducting this assessment, NAEP surveyed over 3600 adults ages 21 to 25 living in households across the United States. Assessments were conducted in the respondents home by trained interviewers with each interview lasting approximately 90 minutes. In addition to responding to a broad range of literacy tasks, respondents were asked to provide information detailing their background and current literacy activities.

Whereas previous surveys have focused either on describing the reading activities of adults or on reporting their literacy skills, the NAEP data base provides a unique opportunity to address several issues concerning the relationship between reading practices and demonstrated literacy proficiencies. Specifically, this study addressed the following questions:

- What are the literacy activities of America's young adults with respect to newspapers, magazines, books, and brief documents?
- How can these varied activities be characterized in terms of reading patterns?
- In what ways are the identified patterns of reading practices related to demonstrated proficiencies?
- Do these relationships vary as a function of background characteristics?

Methodology

Subjects

The target population for the NAEP literacy assessment was the population of young adults who at the time of the survey (April through September, 1985) resided in private households and who were between the ages of 21 and 25 years. The goal of the sample design was to achieve a representative sample of this target population and to sample black and Hispanic young adults at approximately double their normal rate. Oversampling black and Hispanic young adults ensured that samples of these subgroups would be large enough to yield reliable estimates of their literacy skills as well as background characteristics. A total of 38,400 housing units in 800 locations were screened for eligible respondents by some 500 trained interviewers. Of the 4,494 young adults who were selected for the assessment, interviews were completed with 3,618, a completion rate of 80.5 percent.

The achieved sample was judged to be representative of the roughly 21 million men and women in this age group. About two percent of this population, or approximately 440,000 young adults, were judged to have such limited literacy skills that they were not administered the literacy tasks of the assessment. Slightly more than half of this two percent, or about 225,000 individuals, were estimated to be Spanish-speaking. Because of the relatively small number of respondents judged to have limited skills, the data reported here and in the NAEP study are based on the 98 percent of the sample who were English-speaking and who responded to the set of literacy tasks.

Table 1 displays the distribution for the achieved sample of 3,618 young adults. Additional details and considerations involving sampling, weighting, and data collection activities are reported in Kirsch and Jungeblut (1986).

Table 1:
The Achieved NAEP Sample of 21- to 25- Year Olds

	N	Weighted N
English speaking adults who responded to the set of literacy tasks		
TOTAL	3,474	20,720,464
GENDER		
Males	1,544	10,054,793
Females	1,930	10,665,671
RACE/ETHNICITY		
Whites	1,997	16,018,109
Blacks	957	2,693,192
Hispanics	391	1,264,984
Other	129	744,179
English speaking who did not respond to the set of literacy tasks	64	224,799
Spanish speaking respondents	80	213,081

Materials

The NAEP assessment recognized the need to obtain background information in conjunction with performance measures to better understand the nature of literacy in our society. In fact, the background and attitude questions represented 30 of the 90 minutes allotted for data collection. The remaining time of 60 minutes was allocated to the measurement of specific literacy skills.

Background and Attitude Survey. The background and attitude survey was developed not only to characterize the young adult population in terms of demographic characteristics, but also to yield information that would help to provide a deeper understanding of the factors that are related to the observed distributions of literacy skills.

The questions, therefore, focused on issues such as family background; respondent characteristics; educational attainment; educational barriers; use and perceived utility of literacy in the home, community, and workplace; occupational status; and literacy activities. Given the purpose of this study, we will describe in greater detail the questions relating to literacy activities. A copy of the complete background and attitude questionnaire will be found in the NAEP final report (Kirsch & Jungeblut, 1986). The part of the background and attitude questionnaire dealing with literacy activities focused on newspapers, magazines, books, and brief documents.

Respondents were asked to report how often they read a newspaper in English. While information on frequency is interesting, it is incomplete without an indication of the particular content read. Thus , young adults also reported on whether or not they engaged in reading each of 13 contents that included editorials; national, state, financial, or societal news; sports; book or movie reviews; comics; horoscopes; classified ads; general advertisements; and, TV or movie listings.

In addition to newspaper reading, young adults reported the number and kinds of magazines they looked at or read on a regular basis. Respondents were asked to name up to five magazines that they read for work or school and up to five that they read for their own enjoyment.

Young adults were also asked to provide information regarding their reading of books. They were first asked to indicate whether or not they read or looked something up in a book in the past six months. Those who responded "yes" were asked to indicate which

of seven possible content areas they read. These included fiction, history, science, recreation or entertainment, religion, reference materials, and manuals.

Brief documents include materials that are generally short in length and often technical in nature. Examples include memos, business letters, forms, diagrams, charts, warranties, catalogs, maps, bills, and so forth. Respondents were asked to indicate which of these materials they read and/or wrote.

Literacy tasks. In developing tasks for inclusion in the NAEP assessment, primary emphasis was placed on representing the range of literacy behaviors that people frequently encounter in occupational, social, and educational settings. To assist in determining the nature of such materials and associated tasks, lists of objectives in competency-based adult programs, exisiting literacy measures, and studies of literacy in various contexts were reviewed (Kirsch & Jungeblut, 1986).

Based on the review, 12 categories of materials were identified: sign/label, directions, memo/ letter, advertisements, form, table, graph, prose, index, notice, schematic, and bill / invoice. Given the premise that use — or the type of information sought — influences the skills and strategies needed to successfully complete a given task (Kirsch & Guthrie, 1980; Pearson & Johnson, 1978; Sticht, 1978), five categories of use were also identified: knowledge, evaluation, specific information, social interaction, and application. The matrix resulting from crossing materials with use categories provided the framework for task development. In addition, an effort was made to reflect various levels of information-processing skills associated with adult contexts. It shoud be noted that tasks were not developed to fill all of the cells in the matrix because some cells reflect areas adults do not normally encounter (e.g. one does not typically read a set of directions for the purpose of evaluation and one rarely reads a bill for the purpose of social interaction).

Efforts were undertaken to create assessment tasks that simulate literacy skills in particular contexts instead of traditional multiple choice tasks. It was felt that such simulations would provide a more ecologically valid and useful assessment of literacy competencies. For example, NAEP printed a four-page newspaper containing a selection of articles and materials that had appeared in national newspapers across the United States. Respondents were asked to summarize arguments from an editorial, to explain orally what they had read in a news story, to locate specific information in different stories, to look up information in a TV listing, and to locate information in classified listings.

Other tasks required respondents to use the index from the World Almanac to locate the correct page reference and then to extract the necessary information from the appropriate prose, table, chart, graph, or the like. Respondents were also asked to write a short interpretation of a poem, to fill out a job application, to use a check ledger to enter and compute a running balance, to use information from a page in a catalog, to complete an order form, to use information to select flights for people arriving from different cities to attend a conference, to read and understand stories, and more. In total, some 105 scorable tasks were included in the NAEP assessment.

Procedures

Data collection and quality control. Data collection activities were performed by Response Analysis Corporation (RAC) field staff over a six-month period. Approximately 500 trained interviewers conducted individual assessments in the the respondents' homes. Each interviewer received and studied training materials and conducted a practice interview. These completed interview protocols were then reviewed by RAC staff and consultations were provided to clarify any problems noted. Interviewers who were less highly experienced in interview procedures received additional training in sampling

procedures, general interviewing techniques, and in the assessment instruments. This training was conducted in person by area supervisors in 12 regional training sessions.

Each interviewer had responsibility for screening a selected set of households, for following explicit sampling instructions, for selecting an eligible respondent within a household, for conducting the assessment, and for returning all materials to RAC. In general, the interviewer acted as a neutral proctor throughout every assessment interview. The interviewer guided each respondent through a session using standardized instructions contained in interview guides.

To help assure that correct procedures were being followed, RAC's office staff reviewed all completed assessments before returning them to NAEP for scoring and data entry. This procedure involved reviewing each of the listings made, coding each interview with respect to booklet used and respondent characteristics, and checking to make sure that a set of key questions from each phase of the assessment had been completed. In addition, 25 percent of each interviewer's completed assessments were subjected to a quality control check. This involved contacting the selected respondent and verifying with them responses to a selected set of questions.

Scoring. Most of the simulation tasks that comprised the assessment involved open-ended responses. A scoring guide was developed for each. All of the open-ended tasks in the assessment were then scored by one of eight scorers who had been trained in the task by a NAEP supervisor. In addition, all open-ended tasks were subject to a 20 percent scoring reliability check involving a second reading by a second scorer. Scorer reliabilitiy was estimated on a weekly basis. Overall, the average percent agreement among the eight scorers for all open-ended tasks was 96 percent; however, reliabilities for individual tasks ranged from 86 to 100 percent.

Profiling literacy skills. Given the diversity of literacy demands encountered in our society, three scales were hypothesized: prose literacy, document literacy, and quantitative literacy. In this way, it was possible to acknowledge that the processes associated with prose materials are probably qualitatively different from those associated with documents, such as graphs, charts, and schedules, as well as to provide for a separate assessment of quantitative skills. The hypothesized scales were supported by empirical data (Kirsch & Jungeblut, 1986) and are reflected by the moderate correlations among the scales — .48 to .62.

- ***Prose literacy*** tasks represent the knowledge and skills needed to understand and use information from texts that include editorials, news stories, poems, and the like;

- ***Document literacy*** tasks represent the knowledge and skills required to locate and use information contained in job applications, payroll forms, bus schedules, maps, tables, indexes, and so forth; and,

- ***Quantitative literacy*** tasks represent the knowledge and skills needed to apply arithmetic operations, either alone or sequentially, that are embedded in printed materials, such as in balancing a checkbook, figuring out a tip for a meal, completing an order form, or determining the amount of interest from a loan advertisement.

Each of the literacy tasks was placed on a proficiency scale (Prose, Document, and Quantitative) that was designed to range from 0-500 with a standard deviation of 50. In addition, individuals can also be placed along a particular scale based on statistical criteria, thereby providing a means for estimating proficiencies as well as for relating these proficiencies to background characteristics of interest (Messick, Beaton, & Lord, 1983).

Results

In this section of the paper, we will address each of the four questions raised in the introduction. First, to help set the context, we will briefly describe some of the literacy activities of young adults with respect to newspapers, magazines, books, and brief documents. Next, the focus will shift to aggregating these activities into a set of reading patterns. These patterns will then be described for major subgroups of the population and related to reading proficiency scores. In a final section, we will present the results of regressing reading patterns along with other background variables on literacy proficiency.

Literacy Activities

Within the context of the current rhetoric concerning high estimates of "functional illiteracy" or "aliteracy," it is interesting to note that the young adult data seem to be anomalous — that is, although estimates of "functional illiteracy" reach 50 percent or higher (e.g. Kozol, 1985), some 90 percent of the total group of 21- to 25- year olds reported reading a newspaper at least once a week. Moreover, 45 percent reported reading a newspaper on a daily basis. In fact, only two percent reported never reading a newspaper (Kirsch, Jungeblut, & Rock, 1988). Similarly, approximately 85 percent of young adults reported that they had read or used a book in the past six months and about the same percentage reported that they read at least one magazine on a regular basis.

The fact that the overwhelming majority of this population reported reading or using various types of printed materials on a regular basis suggests that, as a population, young adults participate in activities that provide them with an opportunity to come into contact with a broad and diverse body of information. Given the focus of the current study,

however, a more important question is the number of contents that are read within these four types of materials.

Table 2 summarizes the average number of content areas read within newspapers as well as the average number of different magazines, books, and brief documents read. This information is given for the total young adult population as well as by racial/ethnic group, respondent's level of education, and level of parental education. It is interesting to note that when the data are aggregated in this manner there are no statistically significant differences among white, black, and Hispanic young adults with respect to the average number of content areas read within newspapers or the average number of different magazines, books, or brief documents that are read or used. Even more surprising is the fact neither respondent's level of education nor parental education distinguished among the average number of content areas read or average number of different magazines, books, or brief documents read. Although the trend within each category is in the expected direction, significance is not reached, in part, because of the relative size of the standard deviations. It may be the case that aggregating the data in this manner does not reflect the various patterns of reading that are exhibited among these various subpopulations — a topic we turn to next.

Reading Patterns

Given the variability that exists in average contents read in newspapers and in the different number of magazines, books, and brief documents that are read, it was decided to classify each respondent with respect to whether they reported high or low acitivity within a particular print category. To use all the available data in the analyses, the decision was made to cut at the point that divided each distribution in half. So, for example, with respect to newpapers, 50 percent of the 21- to 25 - year olds read 5 or fewer

Table 2

Average Number of Content Areas Within Newspapers, and Different Magazines, Books, and Brief Documents Read by Race/Ethnicity, Educational Attainment, and Parental Education

	Newspapers**	Magazines**	Books**	Brief Documents**
Race/Ethnicity				
White	**5.8** (3.0)	**2.5** (1.6)	**2.9** (2.0)	**15.6** (7.7)
Black	**5.6** (3.2)	**2.6** (1.6)	**2.3** (1.9)	**12.1** (7.6)
Hispanic	**5.7** (3.2)	**2.4** (1.7)	**2.3** (1.9)	**13.8** (7.8)
Educational Attainment				
0-8 years	**2.8** (3.2)	**1.6** (1.3)	**1.4** (1.7)	**7.9** (5.9)
9-12, no diploma	**4.7** (3.0)	**2.0** (1.6)	**1.4** (1.4)	**8.8** (5.7)
High school grad. and/or some post-secondary exp.	**5.5** (3.0)	**2.4** (1.6)	**2.3** (1.8)	**13.8** (7.1)
Postsecondary degree	**6.6** (2.9)	**2.9** (1.6)	**4.0** (1.8)	**19.0** (7.2)
Parental Education				
0-8 years	**4.6** (3.4)	**2.0** (1.6)	**1.8** (1.6)	**11.0** (7.0)
9-12, no diploma	**4.8** (3.0)	**2.1** (1.5)	**1.9** (1.8)	**11.0** (6.3)
High school grad. and/or some post-secondary exp.	**5.8** (3.1)	**2.6** (1.6)	**2.7** (1.9)	**14.9** (7.4)
Postsecondary degree	**6.3** (2.8)	**2.9** (1.6)	**3.6** (2.0)	**18.0** (7.6)
Total	**5.7** (3.1)	**2.5** (1.6)	**2.8** (2.0)	**15.0** (7.8)

* Numbers in parentheses are standard deviations

** Range: newspapers — 0 to 13
magazines — 0 to 5
books — 0 to 7
brief documents - 0 to 36

contents at least once a week and 50 percent reported that they read between 6 and 13 contents within newpapers. These groups were classified as low and high newspaper readers, respectively. Similar procedures were followed for categorizing individuals into low and high magazine, book, and brief document readers or users. This resulted in 16 categories of readers that are shown in Table 3. These 16 categories were then combined to reflect five reading patterns. Based on these analyses, about 20 percent of the population of young adults exhibited each of the five patterns. That is, roughly 19 percent of the young adults reported low reading activities with respect to each type of material — newspapers, magazines, books, and brief documents. Similarly, about 19 percent were found to have high activity with respect to one type of material. Approximately 23 percent had high activity with two types of materials and about 22 percent had high activity with three types of materials. Just over 17 percent were judged to have high activity with each of the four types of materials. The next step was to relate these five reading patterns to proficiency on the prose, document, and quantitative literacy scales.

Relating Reading Patterns to Literacy Proficiency

Table 4 displays the average proficiency score of young adults demonstrating each of the five reading patterns for the total group as well as by race/ethnicity, gender, and level of education. On each of the scales for the total population, the increase in reading proficiency is significant across each of the five patterns of reading. That is, young adults who evidenced Pattern 1 (low activity with each of the four types of materials) attain lower average proficiency scores than do those young adults who demonstrated Pattern 2 (high activity with any one type of material); those evidencing Pattern 3 (high activity with any two types of materials) attain higher average proficiency scores than do those who demonstrated Pattern 2; and, so forth. For example, on the Prose scale, average

Table 3

Percentages of Young Adults
Categorized By Five Reading Patterns

Reading Pattern	Type of Material* (BD	B	M	N)	Percentages of Young Adults
1	0**	0	0	0	19.3
2					19.2
	0	0	0	1	
	0	0	1	0	
	0	1	0	0	
	1	0	0	0	
3					22.7
	0	0	1	1	
	0	1	0	1	
	0	1	1	0	
	1	0	1	0	
	1	0	0	1	
	1	1	0	0	
4					21.6
	0	1	1	1	
	1	0	1	1	
	1	1	0	1	
	1	1	1	0	
5	1	1	1	1	17.2

* Type of Material: BD = brief documents
B = books
M = magazines
N = newspapers

**Code: 0 = low reading activity
1 = high reading activity

proficiencies increase from 253 for Pattern 1, to 279 for Pattern 2, to 292 for Pattern 3, to 302 for Pattern 4, to 314 for Pattern 5.

This general trend observed for the total population is also evident among the major subgroups represented in Table 4. However, the differences in reading proficiency scores from one pattern to the next do not always attain statistical significance. This failure to reach statistical significance for each contiguous difference is in part a function of sample size as reflected in the estimated standard errors. If instead we impose less stringent requirements on the data and compare, for example, the results for Pattern 2 with Pattern 4, we find that 22 of the possible 27 subgroup comparisons reach significance. Of the five non-significant comparisons, all but one is found among levels of education, and these occur predominantly for those individuals reporting a post-secondary degree. This finding is not very surprising given the restricted range of proficiencies of individuals who have attained the highest levels of education. For example, for those young adults with a post-secondary degree, the average reading proficiency on the Prose scale ranges only some 23 points — from 313 for Pattern 1 to 336 for Pattern 5. By comparison, for individuals with 9-12 years of education average proficiency on the Prose scale ranges some 51 points — from 235 to 286.

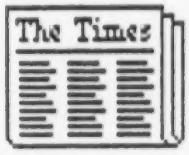
Although the results among subgroups are not consistent across the three scales, these minor shifts are not of primary interest in this study. Of greater concern here is the emergence of general tendencies, that is, for example, women attaining higher average proficiency scores than men within each of the five reading patterns. However, these differences reach statistical significance on each scale only for Pattern 2 (high activity with any one type of material) across the three literacy scales and on the Prose scale for Pattern 5 (high activity with each of the four types of materials).

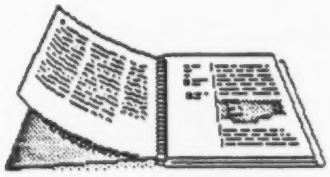
Table 4

The Average Proficiency Score of
Young Adults Demonstrating One of Five Reading Patterns,*
By Race/Ethnicity, Gender, and Level of Education

On The Prose Scale

	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5
Total	253[1] (2.9)[2]	279 (2.9)	295 (2.6)	301 (2.7)	314 (2.8)
Race/Ethnicity					
White	268 (3.9)	291 (3.7)	304 (3.1)	310 (3.0)	318 (3.3)
Black	227 (4.0)	239 (4.3)	248 (4.3)	256 (5.2)	284 (5.6)
Hispanic	248 (5.5)	261 (6.8)	279 (6.8)	277 (7.4)	301 (8.6)
Gender					
Male	246 (4.6)	271 (4.5)	284 (3.7)	290 (4.3)	307 (3.8)
Female	257 (3.6)	285 (3.6)	299 (3.7)	306 (3.3)	318 (3.9)
Education					
0-8 yrs.	198 (6.4)	203 (14.0)	220 (10.3)	231 (12.1)	0 (0.0)
9-12, no dip.	228 (4.6)	246 (4.3)	253 (5.0)	264 (8.1)	286 (9.3)
HS dip. and/ or some post-secondary exp	261 (3.2)	281 (3.2)	297 (2.8)	296 (2.1)	309 (3.3)
Post-secondary degree	313 (13.1)	334 (7.2)	334 (6.3)	338 (4.4)	336 (4.2)





On The Document Scale

	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5
Total	248 (3.2)	273 (3.1)	291 (2.6)	308 (2.5)	318 (2.9)
Race/Ethnicity					
White	265 (4.2)	288 (3.8)	301 (2.7)	313 (2.9)	324 (3.2)
Black	224 (4.7)	229 (4.9)	246 (4.5)	264 (4.9)	277 (6.1)
Hispanic	186 (7.3)	239 (8.7)	269 (7.4)	289 (8.2)	292 (7.3)
Gender					
Male	248 (5.1)	268 (5.0)	291 (3.7)	305 (4.2)	316 (4.5)
Female	253 (4.2)	281 (3.8)	291 (3.2)	306 (3.1)	319 (3.6)
Education					
0-8 yrs.	179 (9.1)	184 (22.2)	231 (14.8)	302 (30.9)	0 (0.0)
9-12, no dip.	231 (5.1)	244 (5.3)	266 (5.4)	273 (6.7)	287 (8.4)
HS dip. and/ or some post-secondary exp	266 (3.7)	276 (3.3)	293 (2.8)	309 (3.0)	306 (3.5)
Post-secondary degree	279 (18.9)	334 (7.2)	331 (5.2)	337 (4.9)	338 (4.5)

On The Quantitative Scale

	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5
Total	262 (3.1)	274 (3.1)	295 (2.6)	306 (2.7)	316 (3.1)
Race/Ethnicity					
White	289 (4.0)	287 (4.0)	303 (3.0)	312 (3.2)	320 (3.5)
Black	233 (5.0)	253 (5.6)	254 (5.0)	272 (5.8)	284 (6.6)
Hispanic	268 (6.7)	254 (7.0)	281 (7.6)	286 (7.2)	304 (10.8)
Gender					
Male	259 (4.9)	267 (5.1)	291 (3.9)	305 (4.4)	317 (4.9)
Female	265 (4.1)	280 (3.9)	299 (3.4)	307 (3.4)	315 (3.9)
Education					
0-8 yrs.	221 (11.1)	221 (16.5)	244 (15.8)	289 (21.0)	0 (0.0)
9-12, no dip.	237 (4.9)	258 (5.3)	266 (5.8)	269 (6.9)	277 (12.5)
HS dip. and/ or some post-secondary exp.	279 (3.7)	289 (3.7)	298 (3.0)	302 (3.0)	308 (3.7)
Post-secondary degree	309 (14.7)	314 (8.1)	319 (5.2)	325 (6.1)	333 (4.9)

*Reading Patterns
Pattern 1 - Low activity in newspapers, magazines, books, and brief documents
Pattern 2 - High activity with any one type of material
Pattern 3 - High activity with any two types of materials
Pattern 4 - High activity with any three types of materials
Pattern 5 - High activity with each of the four types of materials

1 - Numbers in bold are rounded mean proficiency scores
2 - Numbers in parentheses are estimated standard errors

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It is also of interest to note that for Pattern 1 — individuals who were judged to evidence low acitivity with each of the four types of materials — black young adults on average significantly outperform Hispanic young adults on each of the three literacy scales. This finding is in marked contrast with the results for Patterns 2 through 5 as well as with results from other nationally representative data bases such as NAEP and High School and Beyond where Hispanic students consistently outperform their black peers. While it is beyond the scope of the current analyses, one might speculate that Hispanic young adults who were judged to have low activity with the four types of materials may rely more heavily on Spanish language sources of information.

The above discussion describes the relationship between reading patterns and several background characteristics — race/ethnicity, gender, and respondent education. In the next section, these analyses will be extended by examining the results of regression analyses performed to assess the relationships among these and some other variables (respondent occupation and parental education) as they interact with one another. The purpose of conducting regression analyses was to determine the relative importance of reading patterns, given the effects of background variables, in predicting proficiency on the three literacy scales.

A standard multiple regression analysis was performed on the complete set of variables. This analysis enables one to interpret the relative contribution of each variable after controlling for the effects of the others used in the analysis.

Relationships Among Background Variables and Proficiency on the Three Literacy Scales

Inspection of the total group regressions shown in Table 5 reveals high, significant multiple correlations between the set of background variables and performance on the literacy scales — .70 with prose, .67 with document, and .59 with quantitative literacy. The primary predictive variables for each of the three scales are respondent's level of education and racial/ethnic group membership. After controlling for the effects of the other background variables, whites outperform blacks on each of the scales, and to a lesser extent so do Hispanics. The only variable that did not contribute significantly after controlling for the others was occupation. This seems reasonable given the age range of the population. Many of these young adults are in a period of transition between completing their education and entering into career jobs. Accoring to the NAEP report (Kirsch & Jungeblut 1986), approximately one quarter of young adults reported being enrolled in school at the time of the assessment.

Other variables that significantly predict performance on the scales are gender, parental education, and reading patterns. It is interesting to note that women outperform men on each of the scales after controlling for the other variables. This finding is somewhat surprising given that no differences were found among the mean performances of men and women in the NAEP report. It appears that partitioning these groups by reading patterns provides a more sensitive look at sex differences. This is reflected in part by comparing the mean proficiency scores between men and women in Table 4.

Table 5

Direct Effects of Background Variables*
on Prose, Document, and Quantitative Literacy

Background Variables	Standardized and Raw Regression Weights (with Standard Errors)		
	Prose	Document	Quantitative
Gender	.09 8.84 (1.8)	.05 5.75 (2.0)	.06 6.82 (2.2)
Race 1	.27 38.90 (2.6)	.30 44.60 (2.8)	.27 39.97 (3.0)
Race 2	.14 14.70 (2.0)	.10 11.00 (2.1)	.10 10.94 (2.3)
Parental Education	.19 11.90 (1.3)	.14 9.32 (1.4)	.13 8.80 (1.5)
Respondent Educat.	.41 30.47 (1.6)	.33 25.75 (1.7)	.29 22.65 (1.8)
Occupation	-.01 -0.23 (0.4)	.02 0.57 (0.5)	.02 0.46 (0.5)
Reading Patterns	.16 5.99 (0.7)	.23 9.29 (0.8)	.18 6.98 (0.9)
Multiple R	.70	.67	.59

* Variables used in this analysis are presented in a note at the end of this article.

Of greater interest given the purpose of the current study is the fact that reading pattern is a significant predictor of performance on the three scales after controlling for the effects of each of the other variables (Table 5). On the document and quantitative scales, the effect of reading patterns is greater than that of parental education. In fact, the weight obtained for reading patterns on the document scale is approximately 65 percent larger than the weight obtained for parental education, while on the quantitative scale it is about 38 percent larger. While parental education no doubt has an effect along with respondent education on evolving reading patterns, the patterns themselves take on increased importance in explaining the literacy performance of young adults.

Summary and Discussion

Based on the notion that the mature reader participates effectively in a broad array of reading activities, this study was undertaken to address the question, Do adult patterns of reading activity relate to demonstrated literacy proficiencies? Previous research involving time-on-task with beginning readers, adult readership studies, and studies of adult practices extending beyond the school-based context were suggestive of such a relationship. The NAEP data provide a unique opportunity to explore the question directly because the design allowed the information collected about reading activities to be related to estimated proficiency on three literacy scales — prose, document, and quantitative.

To examine the relationship between reading patterns and proficiencies using the NAEP data base, four specific questions were posed: First, what are some of the reported literacy activities of young adults with respect to newspapers, magazines, books, and brief documents? Second, how can these activities be aggregated into reading patterns? Third, how do these patterns relate to levels of proficiency on the three literacy scales? And, fourth, what is the relative importance of reading patterns after taking background characteristics into account?

The data revealed that the overwhelming majority of young adults reported reading or using the various types of materials on a regular basis. That is, 90 percent of the total group of 21- to 25- year olds reported reading a newspaper at least once a week. About 45 percent reported reading a newspaper on a daily basis, and only approximately 2 percent reported never reading a newspaper. Moreover, some 85 percent noted that they had read or used a book in the six months preceeding the assessment and a similar percentage reported that they read at least one magazine on a regular basis.

Information was also obtained about the average number of contents read within newspapers as well as the average number of different magazines, books, and brief documents that were read. It is interesting that when the data are aggregated on this basis, no statistically significant differences were found among white, black, and Hispanic young adults, or among adults with different levels of education. It should be noted, however, that within these background categories the trend is in the expected direction but the specific comparisons do not necessarily reach statistical significance. One possibile explanation is the fact that aggregating the data in this manner does not take into account the various patterns of reading activity within these various subgroups.

We thus sought a method of aggregating the data into reading patterns that would capture the variability among the different subgroups. It was decided to categorize individuals as evidencing either high or low activity within each type of material — newspaper, magazine, book, and brief document. This was accomplished by dividing the population at the midpoint in terms of the number of contents read within newspapers and different number of magazines, books, and brief documents read. This procedure resulted in 16 possible reading patterns that reflected various combinations of high and low activity within each of the four types of materials. These sixteen patterns were then aggregated into five that ranged from low in each of the four types of materials (Pattern 1), to high activity with any one type of material (Pattern 2), to high activitiy with any two types of material (Pattern 3), to high activity with any three types of materials (Pattern 4), to high activity in each of the four types of materials (Pattern 5). As it turned out, approximately 20 percent of the total population of young adults evidenced each of the 5 reading patterns. These ranged from a low of 17.2 percent for Pattern 5 to almost 23 percent for Pattern 3.

These five patterns were then related to proficiency scores on the three literacy scales for the total population as well as by race/ethnicity, gender, and level of education. On each of the scales for the total population, the increase in literacy proficiency was significant across each of the five patterns. On the Prose scale, for example, the proficiencies increase from 253 for those young adults judged to evidence Pattern 1 to 279 for those evidencing Pattern 2 to 292 for those with Pattern 3 to 302 for those with Pattern 4 to 314 for those evidencing Pattern 5.

Of greater interest perhaps is that fact that the general trend observed for the total population was also evident among the various subgroups. However, the differences in proficiency scores for each contiguous reading pattern did not always reach statistical significance. This in part is a function of sample size within each of the cells as reflected in the size of the estimated standard errrors. If one is willing to accept less stringent requirements on the data and compare, for example, the results obtained for Pattern 2 with those obtained for Pattern 4, we find that 22 of the possible 27 subgroup comparisons attain statistical significance.

In addition to providing descriptive results focusing on the relationship between reading patterns and demonstrated levels of literacy proficiency, we also wanted to examine the relative importance of these five patterns in predicting performance after controlling for several background characteristics — race/ethnicity, gender, level of education, level of parental education, and occupation. Regressions for the total group revealed strong positive correlations (ranging from .60 to .70) among the background variables and performance on the three literacy scales. The only background variable that was not significant after controlling for the effects of the others was occupation.

If we examine the standardized regression weights , we see that on two of the three scales — document and quantitative — the size of the effect for reading patterns is greater than that obtained for parental education, gender, and occupation. Thus not only are reading patterns significantly related to performance on each of the scales, but they also have importance in explaining the demonstrated proficiencies of young adults. What is suggested by the findings is that as readers engage in more activity in a variety of reading practices, the higher their level of proficiency.

These findings are consistent with current cognitive theories (Glaser, 1987; Resnick, 1987; Schooler & Schaie, 1987) that have emphasized the role of graded contextual practice in the transition from novice to expert status. As these theories have suggested, one aspect that distinguishes experts from novices is the former's ability to perform not only many different tasks but more complex tasks as well. One means by which this ability is acquired is practice.

In the context of this paper, the concept of practice can be distinguished at two levels: One notion deals with practice as repeated activity that in and of itself is likely to enhance performance. This is to be contrasted with the notion of practice as an articulated sense of form, manner, and order of a body of knowledge — thus, for example, we speak of the "practice" of medicine or law. Operating within the former notion, one seeks merely to establish that a relationship exists between practice and performance. In the latter, the focus is on explaining and understanding the mechanisms through which practice enhances performance. For example, recent work in cognitive science emphasizes the need to understand the mechanisms or cognitive and metacognitive strategies that define the nature of expert practice. According to Collins, Brown, and Newman (in press), these cognitve and metacognitive processes are the "organizing principles of expertise" (p. 3). Moreover, they believe that the acquisition and integration of these processes can best be achieved by

providing learners with carefully devised opportunities to engage in graded mature practice.

Given these two notions of practice, the present study is important because the findings establish empirically the existence of a relationship between reported patterns of literacy activities and demonstrated literacy proficiency in a nationally representative sample of young adults. Showing the relationship, however, is not enough since this simply provides a predictive framework linking practice and proficiency. If our goal is to enhance literacy proficiencies toward developing a larger pool of mature readers, we must move to a program of research that both articulates the organizing principles of such expert practice and develops instructional methods appropriate to enhancing that practice. While some exemplary work using this approach has been done with young children who are learning to read (Palincsar & Brown, 1984; Cross & Paris, 1988), these methods must be refined and applied to the full range of literacy activities associated with adult contexts.

NOTE:

Description of Variables Used in the Analysis

Gender: Male = "0"; Female = "1"

Race/Ethnicity: two variables were constructed such that white and Hispanic young adults were contrasted with black young adults. The variable "Race 1" distinguishes between white and black 21- to 25- year olds. "Race 2" distnguishes between Hispanic and black young adults.

Parental and Respondent Education: Each of these two variables was coded to represent four levels of education — 0-8 years; 9-12 years, but no diploma; high school diploma and/or some post-secondary esperience; and, a post-secondary degree.

Occupation: Occupation was coded into one of nine categories and treated as a continuous variable:

1= Laborer	6= Sales
2= Service	7= Technical
3= Operative	8= Professional
4= Craft	9= Manager
5= Clerical	

Reading Patterns: Individuals were judged to evidence one of five reading patterns based on their reported activities with newspapers, magazines, books, and brief documents. The five patterns described in the paper were treated as a continuous variable.

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